



PREPARATÓRIO DA ENGENHARIA E DA AGRONOMIA PARA O
8º FÓRUM MUNDIAL DA ÁGUA

O DESAFIO PARA GARANTIA DE ACESSO À ÁGUA DE QUALIDADE: FONTES E SUMIDOUROS

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Atmosféricas

*8º Fórum Mundial da Água 2018 - Evento Preparatório CONFEA
10 a 12 Maio de 2017, Manaus, AM, Brasil*

CICLO DA ÁGUA

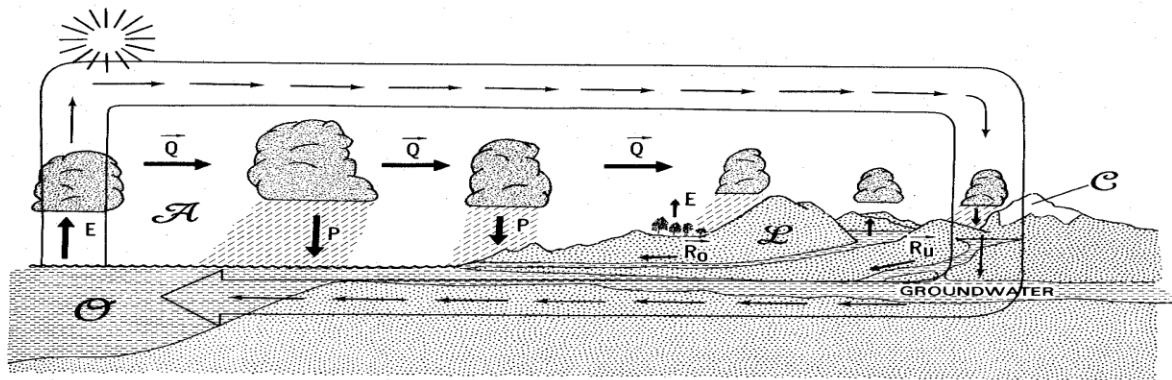


FIGURE 12.1. Schematic diagram of the atmospheric and terrestrial branches of the hydrological cycle showing the importance of evaporation E , advection of water vapor in the atmosphere \bar{Q} , precipitation P , river runoff R_0 , and underground runoff R_u .

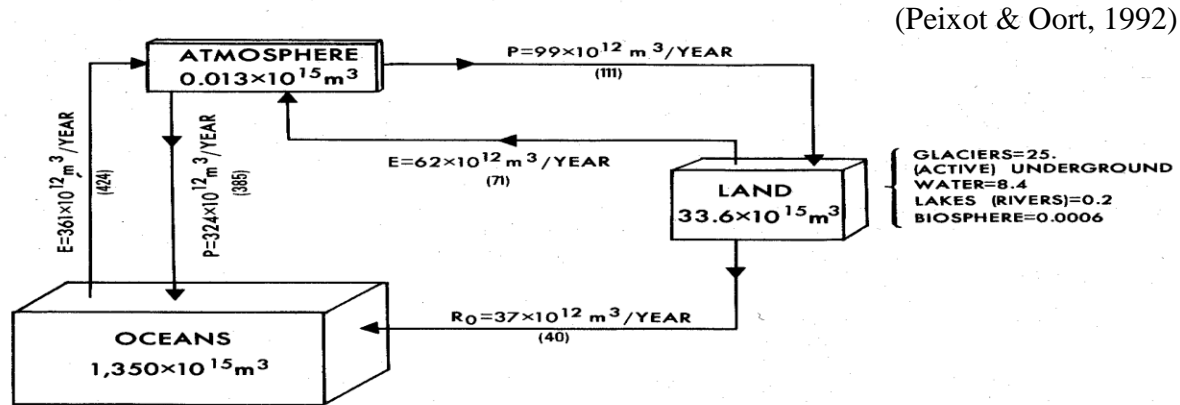


FIGURE 12.2. The amounts of water stored in the oceans, land, and atmosphere, and the amounts exchanged annually between the different reservoirs through evaporation, precipitation, and runoff (estimates are from Peixoto and Kettani, 1973, and, in parentheses, from Baumgartner and Reichel, 1975).

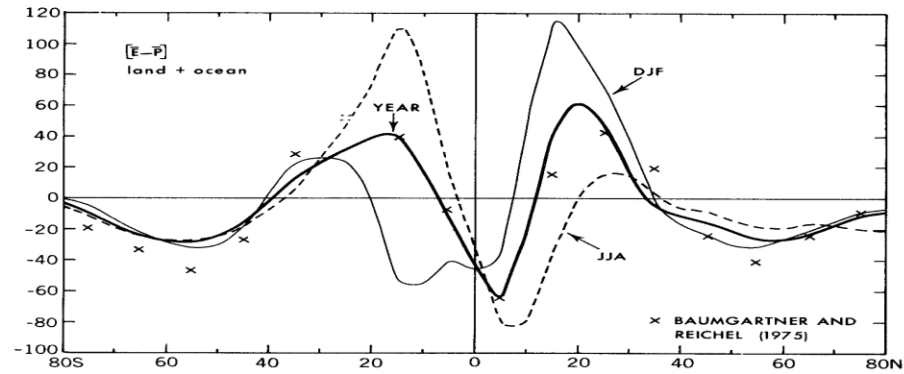


FIGURE 12.16. Meridional profiles of the zonal-mean divergence of the total water vapor transport $[\text{div } \mathbf{Q}] \approx [E - P]$ in 0.01 m yr^{-1} for annual, DJF, and JJA mean conditions. Some annual-mean estimates of $E - P$ by Baumgartner and Reichel (1975) are added for comparison (see also Table 7.1).

(Peixot & Oort, 1992)

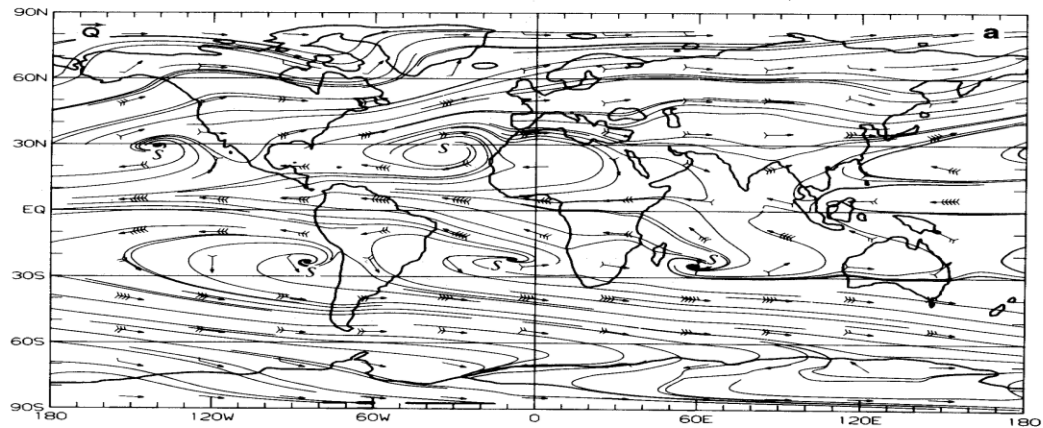


FIGURE 12.17a

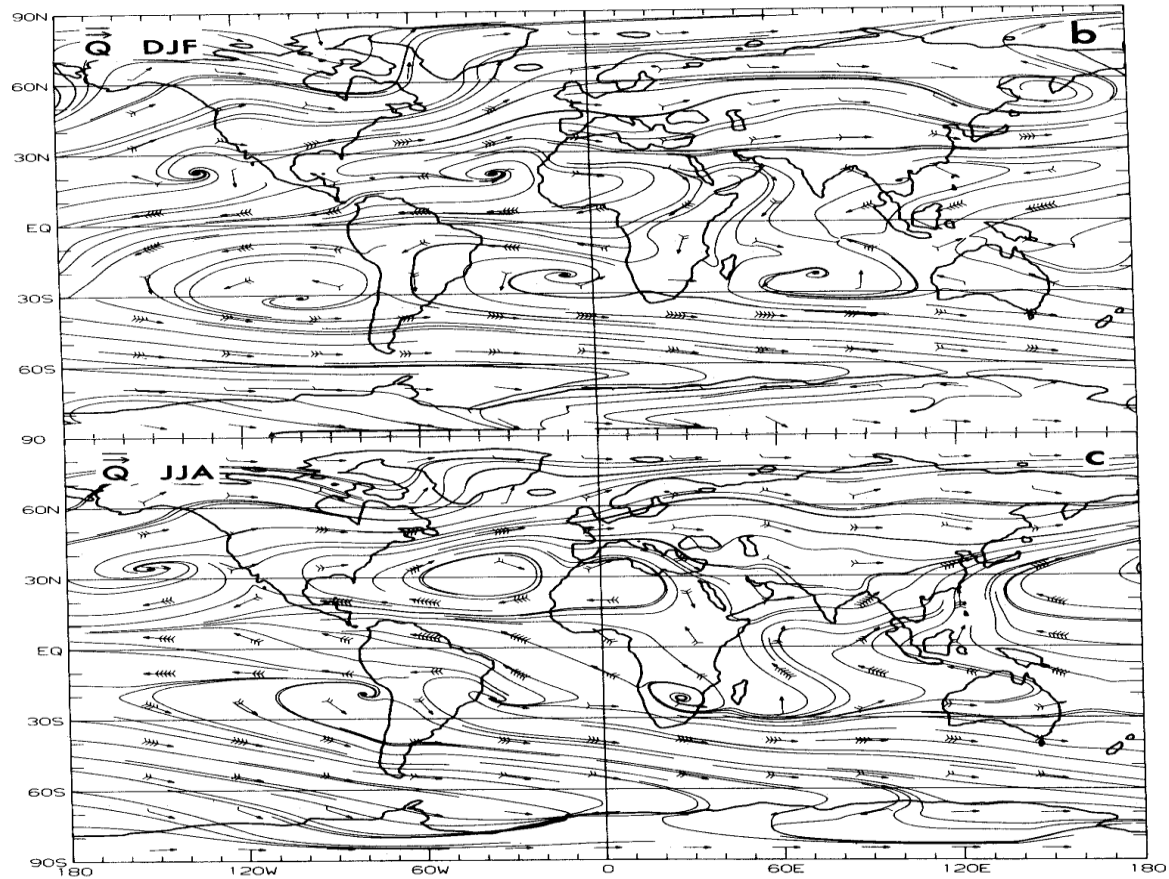


FIGURE 12.17. Global distributions of the total aerial runoff Q and some corresponding streamlines for annual (a), DJF (b), and JJA (c) mean conditions. Each barb on the shaft of an arrow indicates a value of $2 \text{ m s}^{-1} \text{ g kg}^{-1}$ (from Peixoto and Oort, 1983).

(Peixot & Oort, 1992)

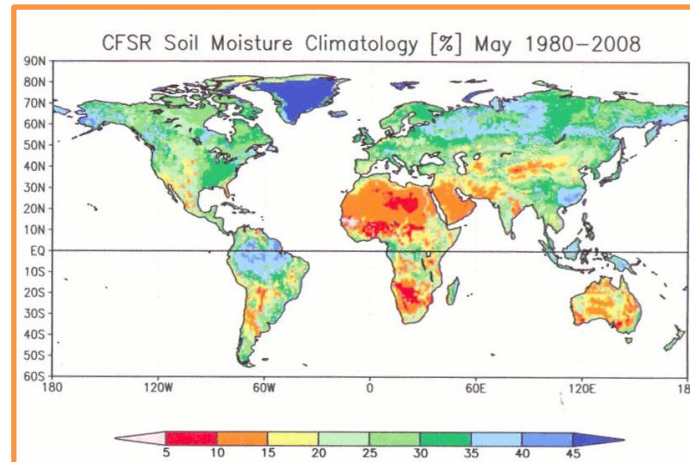


FIG. 17. The 2-m volumetric soil moisture climatology of CFSR for May averaged over 1980–2008.

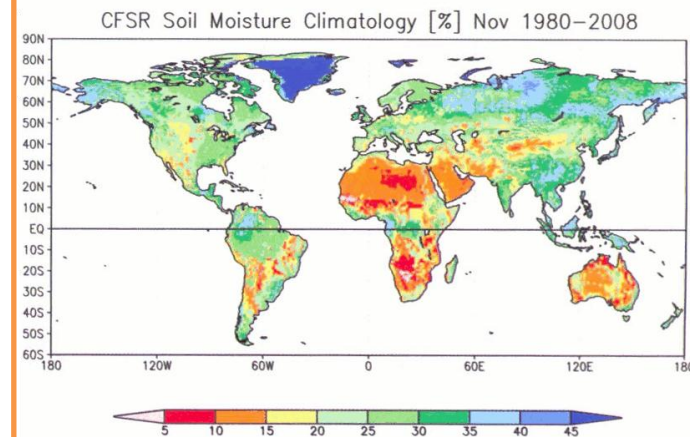
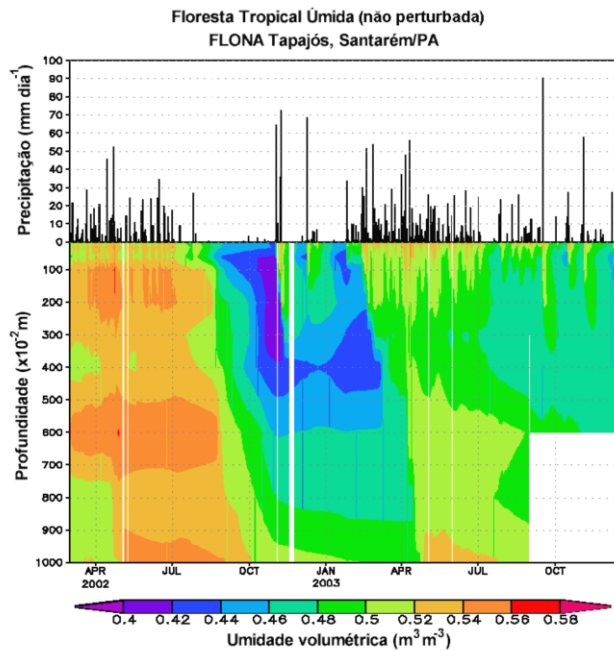


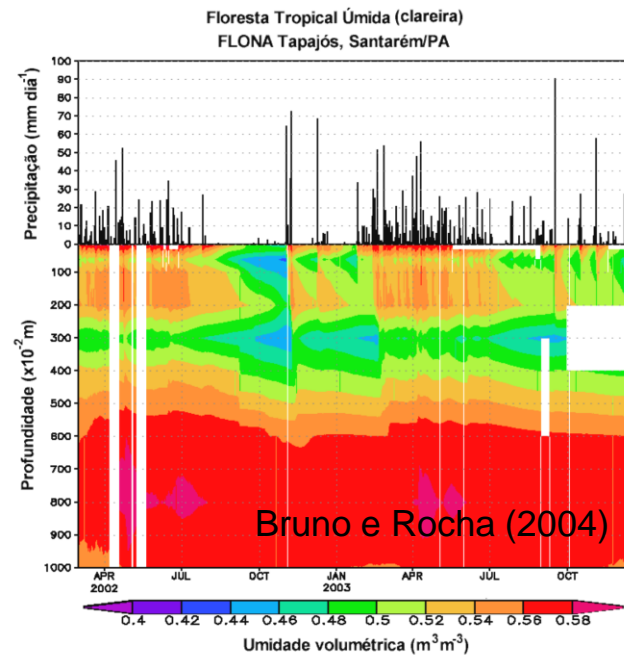
FIG. 18. As in Fig. 17, but for Nov.

(Saha et al. 2010)

Floresta Amazônica



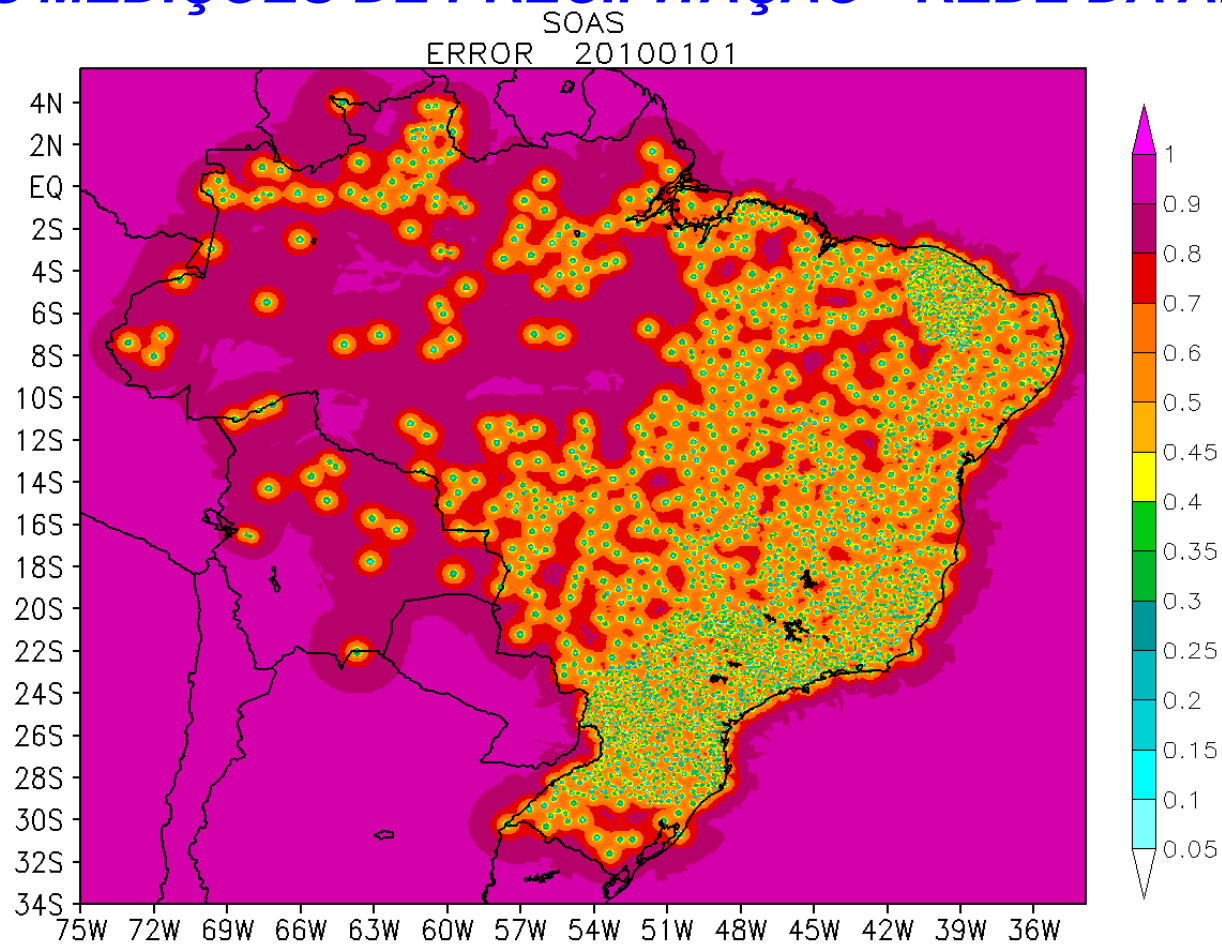
“FONTE DE ÁGUA”



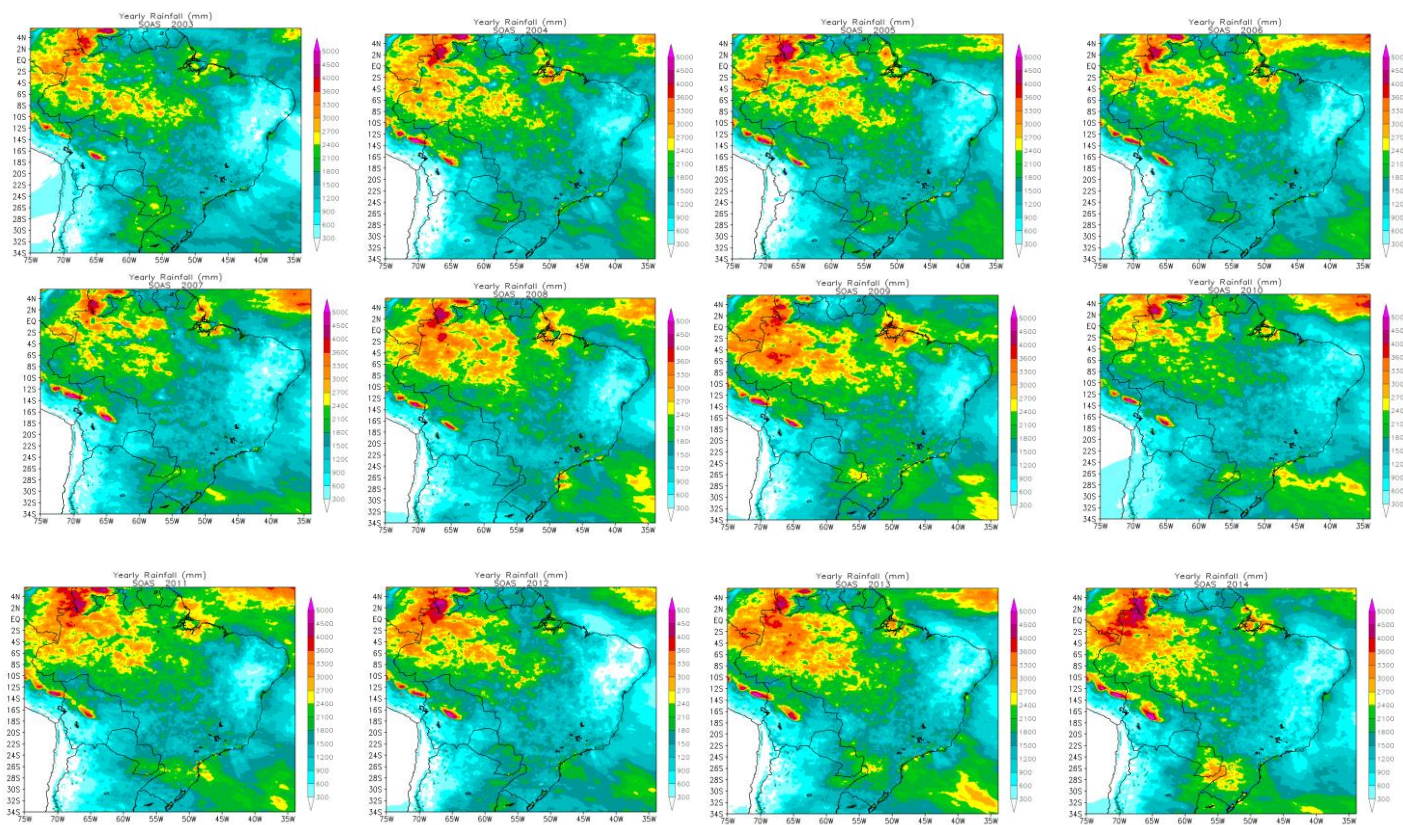
Bruno e Rocha (2004)

“SUMIDOURO DE ÁGUA”

DISTRIBUIÇÃO ESPACIAL DO ERRO NORMALIZADO NAS MEDIÇÕES DE PRECIPITAÇÃO - REDE DA ANA

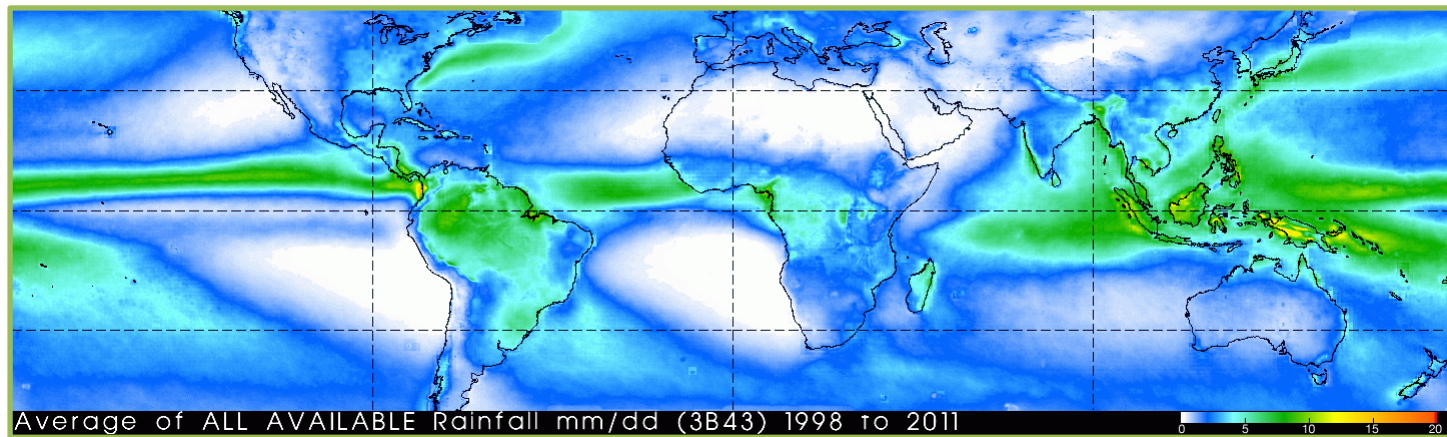
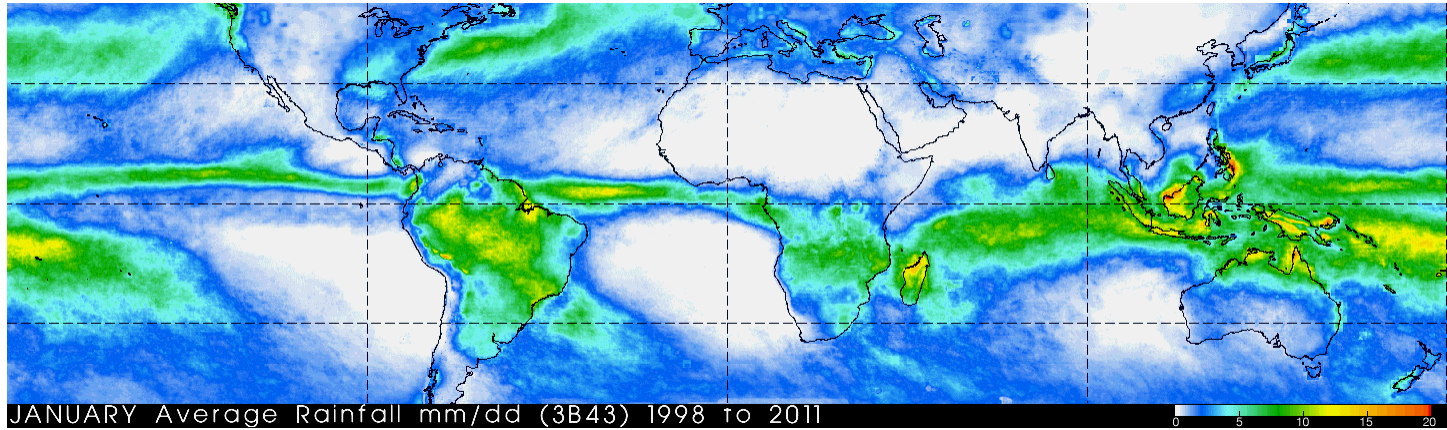


CHUVA ESTIMADA POR SATÉLITE E REDE DE PLUVIÔMETROS ANA

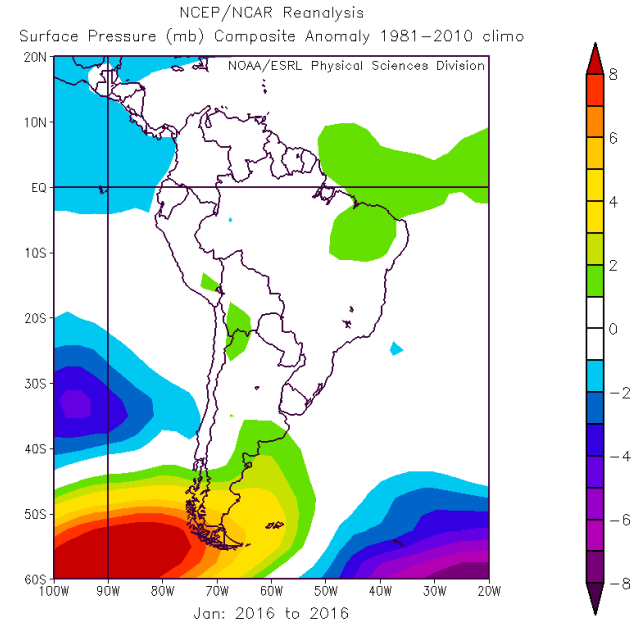
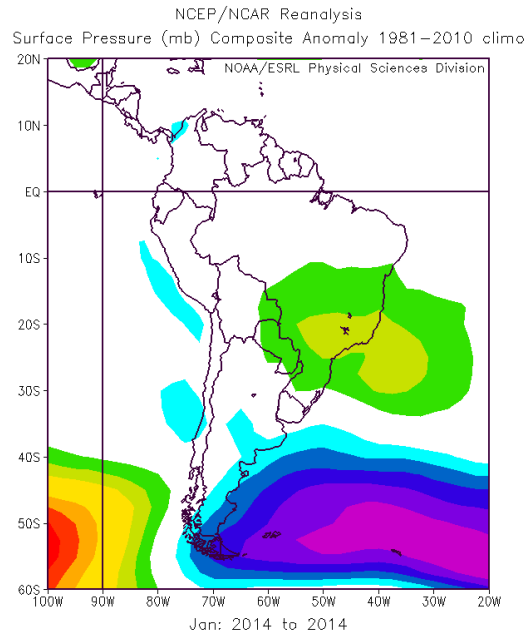


(Pereira Filho et al, 2017)

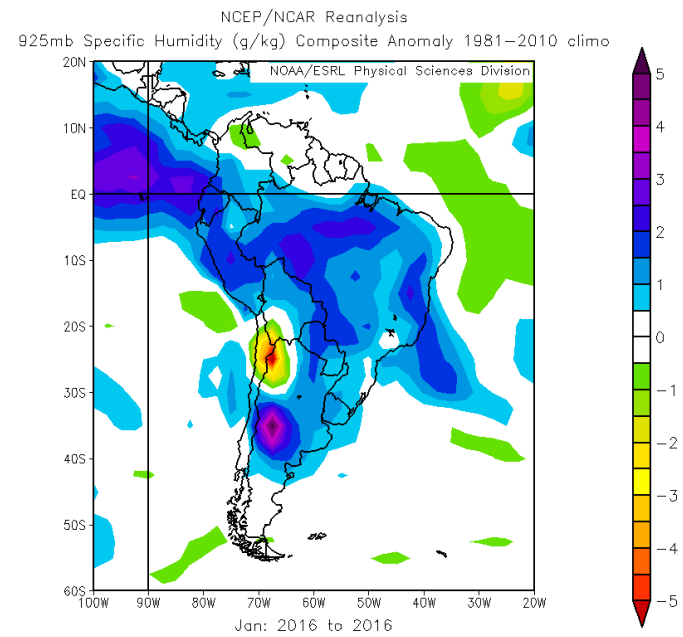
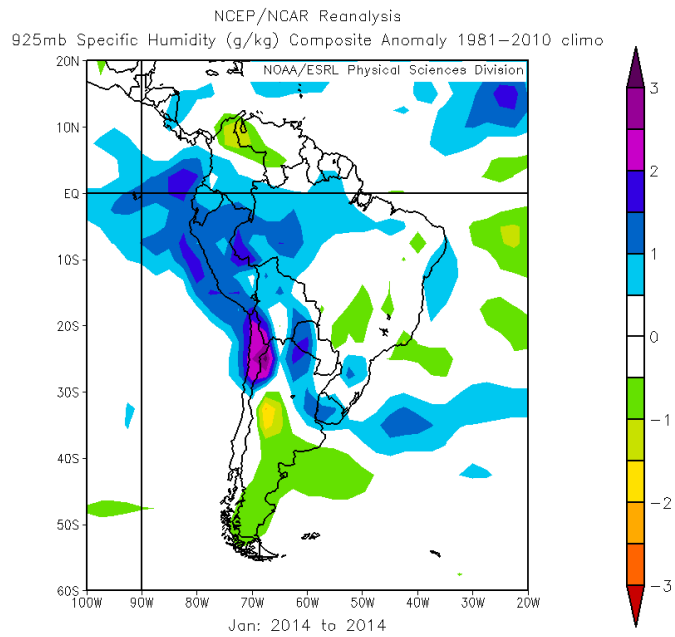
CLIMATOLOGIA TRMM



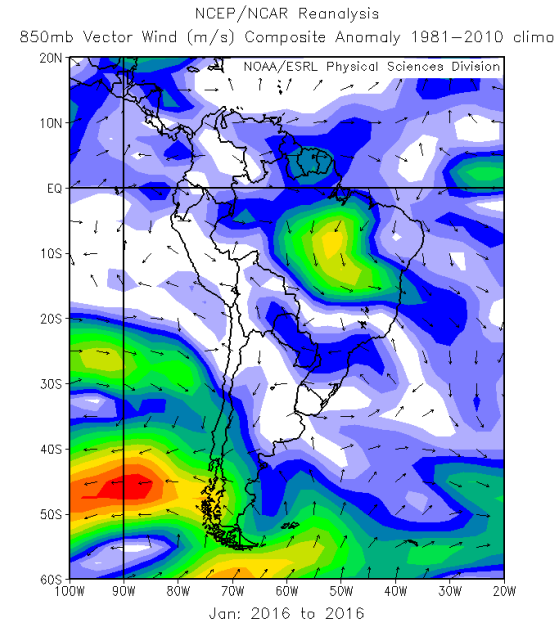
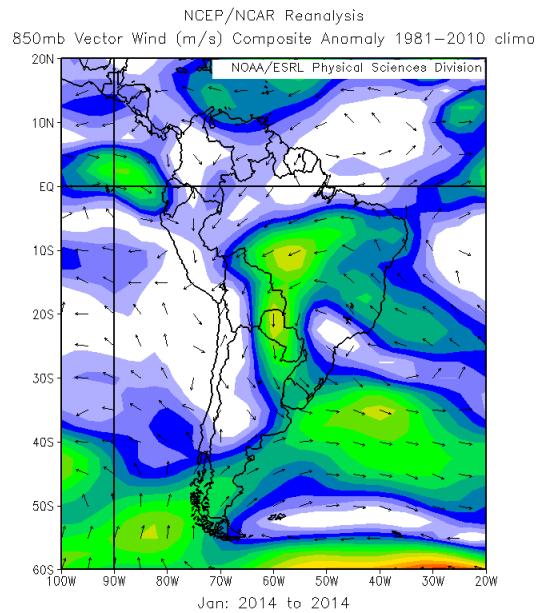
Anomalia de pressão



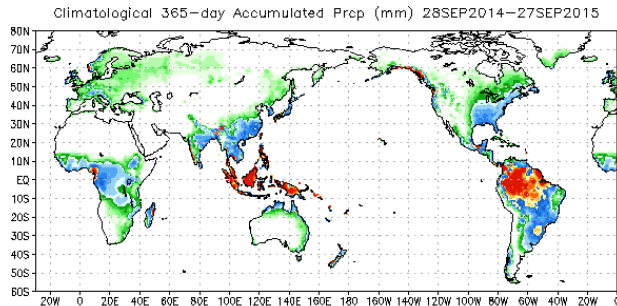
Anomalia de Umidade Específica



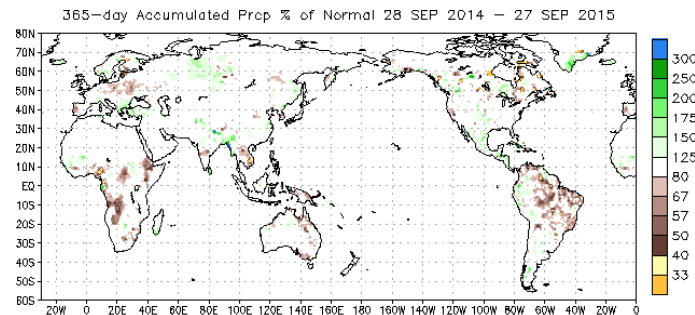
Anomalia de Vento 850 hPa



PRECIPITAÇÃO 365 DIAS 2014/2015

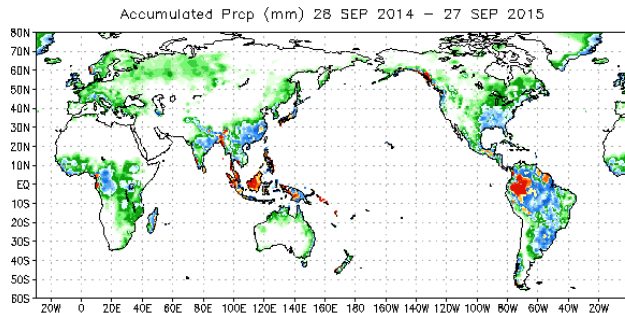


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981–2010)

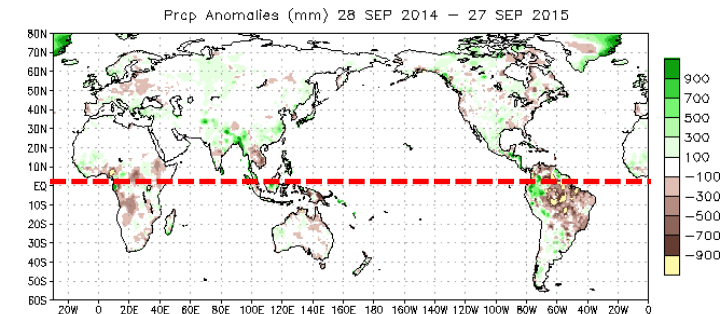


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981–2010)

Note: Areas which receive on average 1mm/day are masked out.

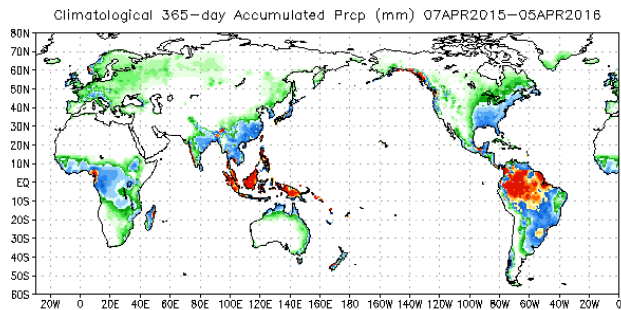


Data Source: CPC Unified (gauge-based) Precipitation

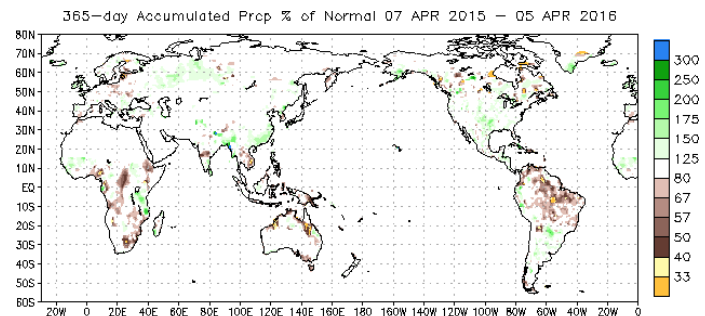


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981–2010)

PRECIPITAÇÃO 365 DIAS 2015/2016

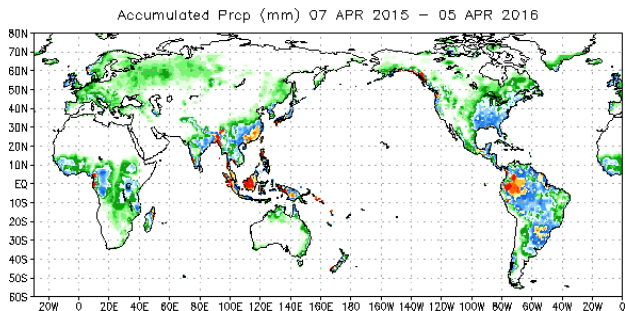


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

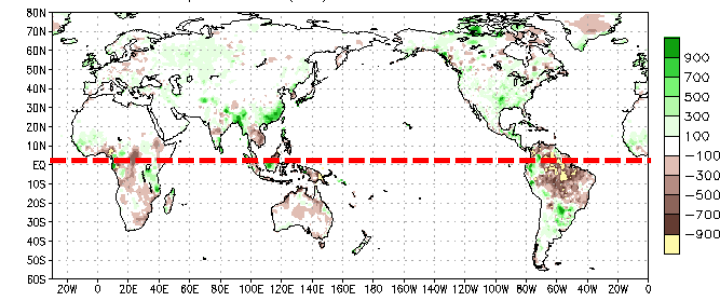


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

Note: Areas which receive on average 1mm/day are masked out.
Prp Anomalies (mm) 07 APR 2015 - 05 APR 2016

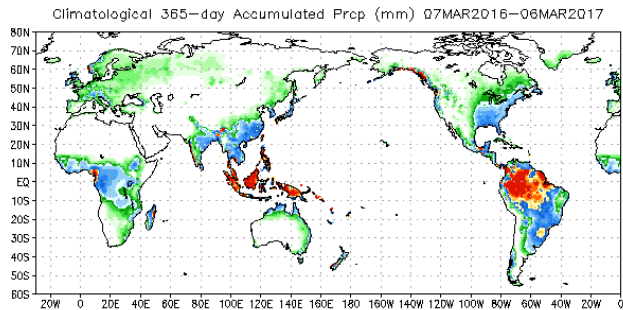


Data Source: CPC Unified (gauge-based) Precipitation

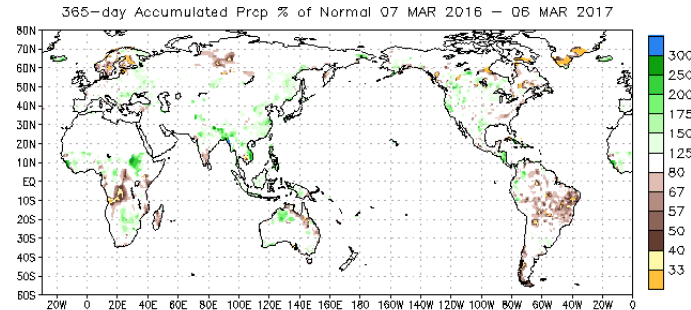


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

PRECIPITAÇÃO 365 DIAS 2016/2017

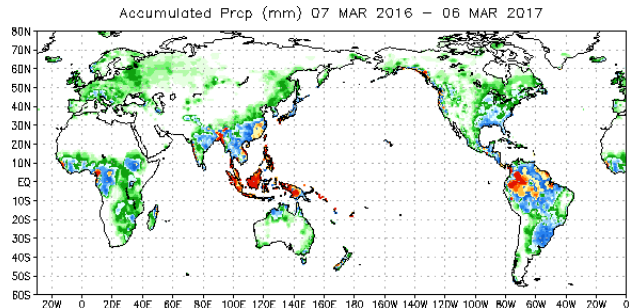


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

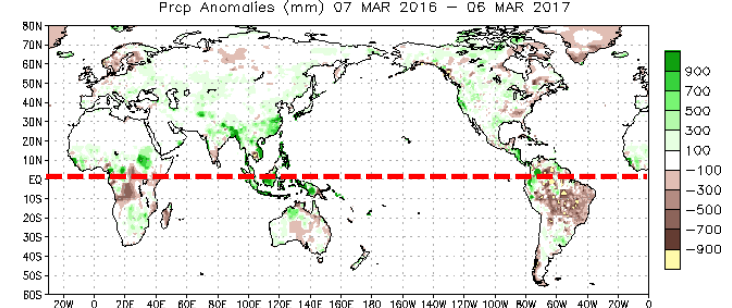


Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

Note: Areas which receive on average 1mm/day are masked out.



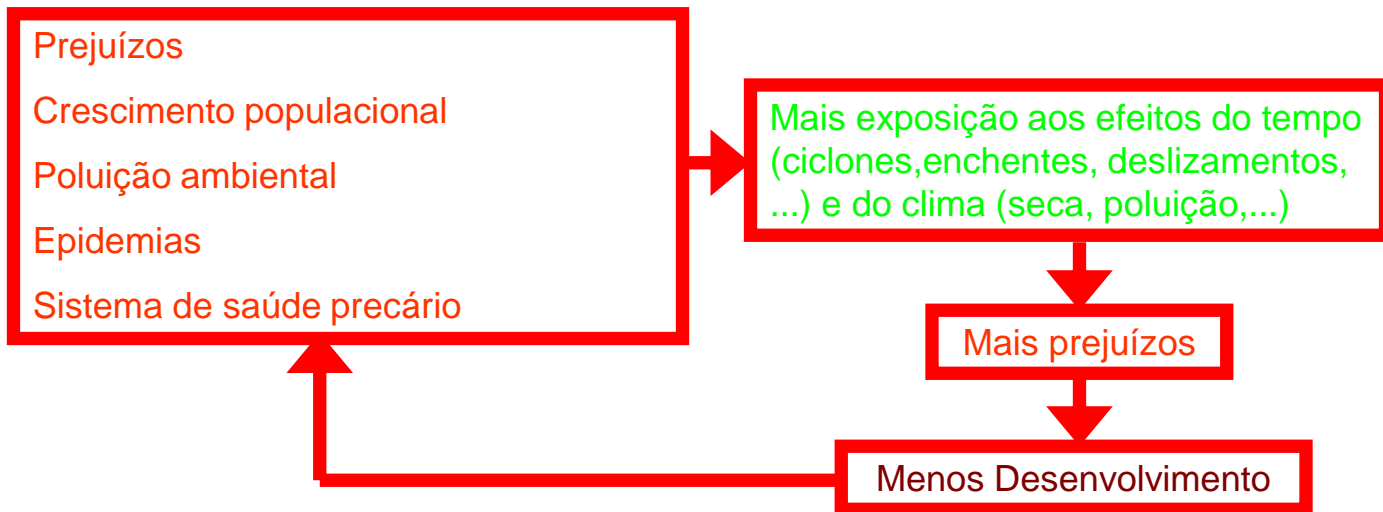
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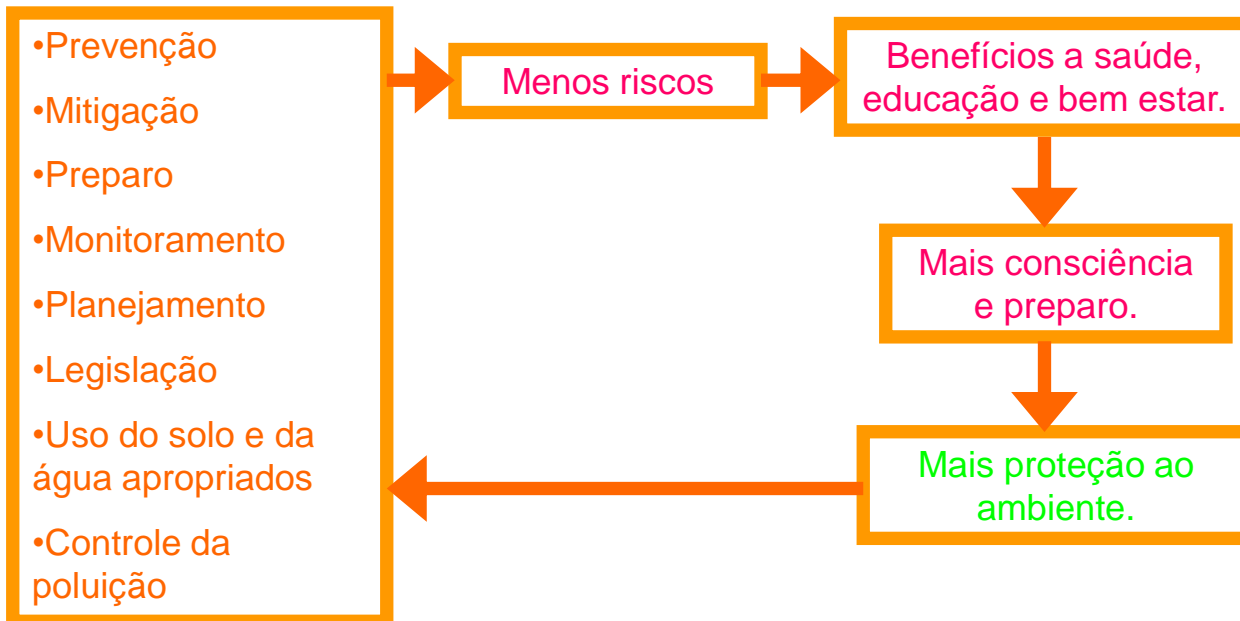
Data Source: CPC Unified (gauge-based) Precipitation
Climatology (1981-2010)

**“As mudanças climáticas
devem causar desastres
naturais mais freqüentes e mais
graves” OMM**

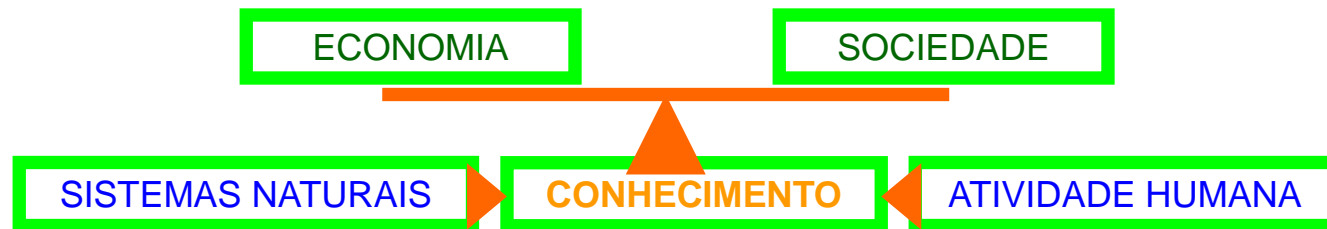
RETRO-ALIMENTAÇÃO POSITIVA DOS PROBLEMAS



GESTÃO AMBIENTAL – FATOR PARA O DESENVOLVIMENTO SUSTENTÁVEL



CIÊNCIA DA SUSTENTABILIDADE



OBSERVAÇÃO DA TERRA E DA ATMOSFERA

(Essenciais para a sustentabilidade)



FERRAMENTAS DE PREVISÃO

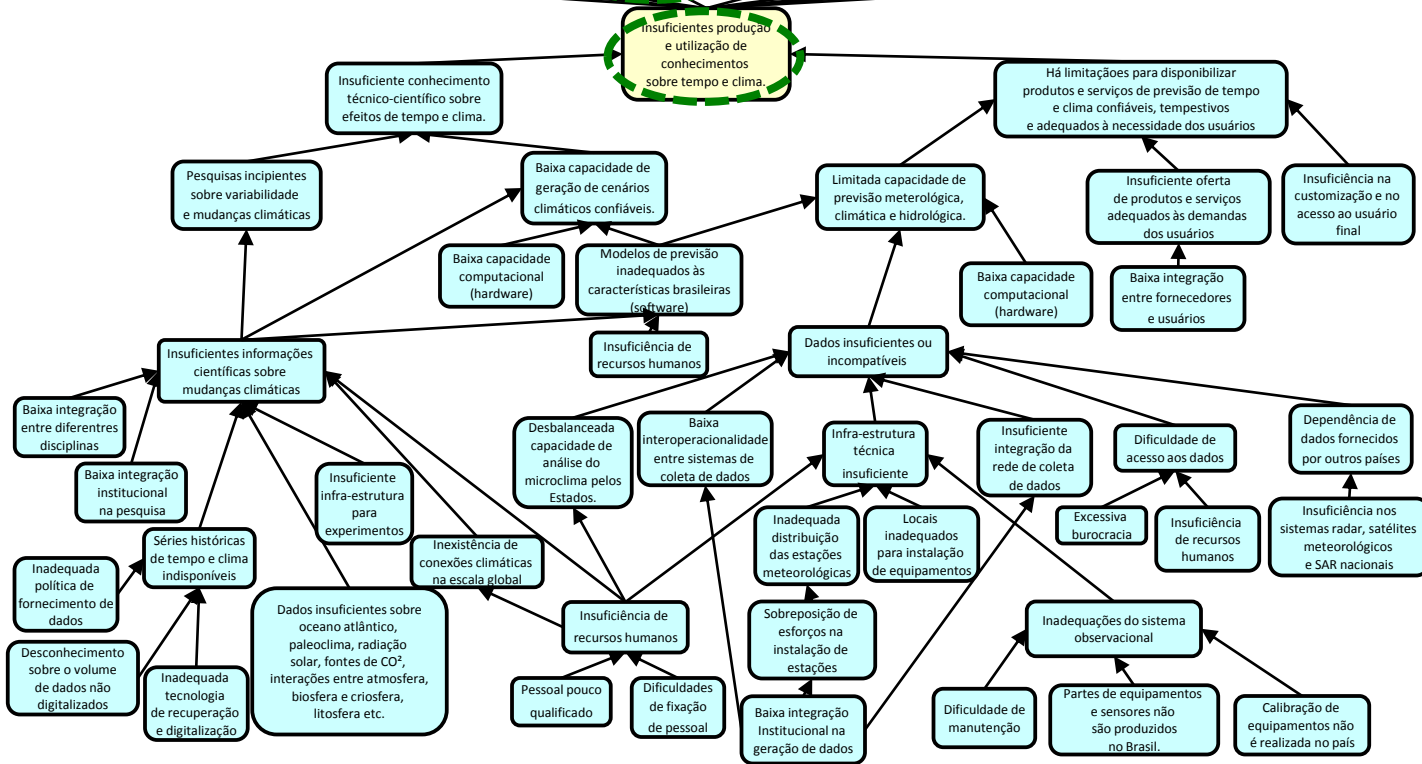
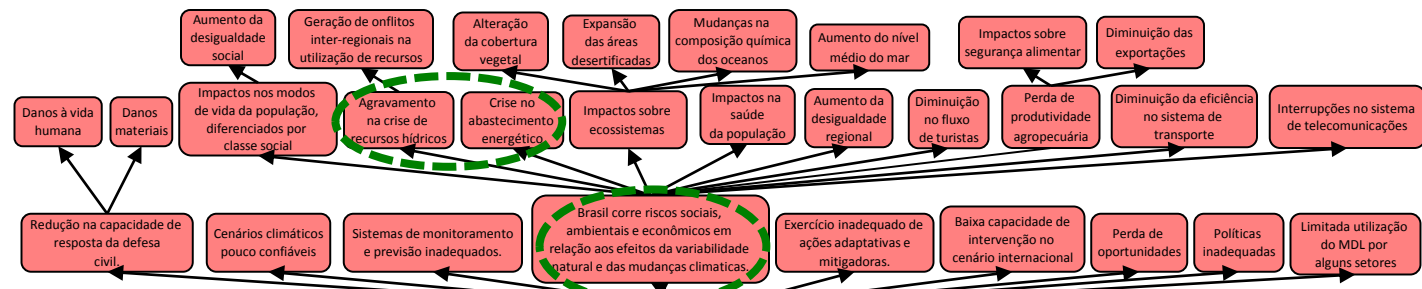
SISTEMAS DE ALERTA

ENTENDIMENTO DO TEMPO E DO CLIMA

INFORMAÇÃO



**REDUÇÃO DE
RISCOS**





PREPARATÓRIO DA ENGENHARIA E DA AGRONOMIA PARA O
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**MUITO
OBRIGADO!**

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